ENGINEERING EVALUATION
County of Solano
PLANT NO. 1995
APPLICATION NO. 8338

BACKGROUND

County of Solano (595 Market Street) is applying for an Authority to Construct and/or Permit to Operate the following equipment:

S-3 Electrical Engine: Natural Gas; Make: Waukesha; Model: VHP9500GSI; Rated Horsepower: 1200; Abated by: A-1 Catalytic Converter, Miratech CS-2003-3072

EMISSIONS SUMMARY

Annual Emissions:

The engine will be run 24 hr/day, 365 day/yr. The engine will be conditionally permitted to meet Best Available Control Technology (BACT) levels by requiring the use of A-1 catalytic converter.

Emission Factors

Pollutant	BACT emission limits
NOx	0.15 g/bhp-hr
CO	0.60 g/bhp-hr
POC	0.15 g/bhp-hr
PM10	0.0 lb/MMBtu
SO2	5.88E-4 lb/MMBtu*

*The emission factor for SO2 is from Chapter 3, Table 3.2-3 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors.

Emissions from S-3:

NOx = (0.15 g/bhp-hr)(1200 HP)(8760 hr/yr)(lb/454 g) = 3473.13 lb/yr = 1.74 tpy
CO = (0.60 g/bhp-hr)(1200 HP)(8760 hr/yr)(lb/454 g) = 13892.51 lb/yr = 6.95 tpy
POC = (0.15 g/bhp-hr)(1200 HP)(8760 hr/yr)(lb/454 g) = 3473.13 lb/yr = 1.74 tpy
PM10 = (0.00 lb/MMBtu)(16.8 MMBtu/hr)(8760 hr/yr) = 0.00 lb/yr = 0.00 tpy
SO2 = (5.88E-4 lb/MMBtu)(16.8 MMBtu/hr)(8760 hr/yr) = 86.53 lb/yr = 0.043 tpy

Maximum Daily Emissions (based on 24 hr/day operation):

Emissions from S-3:

NOx = (0.15 g/bhp-hr)(1200 HP)(24 hr/day)(lb/454 g) = 9.52 lb/day
CO = (0.60 g/bhp-hr)(1200 HP)(24 hr/day)(lb/454 g) = 38.06 lb/day
POC = (0.15 g/bhp-hr)(1200 HP)(24 hr/day)(lb/454 g) = 9.52 lb/day
PM10 = (0.00 lb/MMBtu)(16.8 MMBtu/hr)(24 hr/yr) = 0.00 lb/day
SO2 = (5.88E-4 lb/MMBtu)(16.8 MMBtu/hr)(24 hr/yr) = 0.237 lb/day

Plant Cumulative Increase: (tons/year)

Pollutant	Existing	New	Total
NOx	0	1.74	1.74
CO	0	6.95	6.95
POC	0	1.74	1.74
SO2	0	0.043	0.043
PM10	0	0	0
NPOC	0	0	0

Toxic Risk Screening:

The toxic emissions from the combustion of natural gas for the combustion engine exceeded the District Risk Screening Triggers and a Risk Screening Analysis has been performed. For 8760 hours of operation per year, the maximum cancer risk is 2.2 in a million and the hazard index is 0.6. The increased cancer risk is less than ten in a million and the chronic hazard index is less than one. The levels of risk are considered acceptable under the District's Risk Management Policy for an engine that meets TBACT. Since the engine will be conditionally permitted to meet BACT 2 levels, they meet the District's TBACT requirements. (See memo from Toxics Group, November 7, 2003.)

Toxic Pollutant (8760 hours/yr)	Emission Rate (lb/yr)	Risk Screening Trigger (lb/yr)
1,3 butadiene	**48.79**	**1.1**
Acetaldehyde	**205.30**	**72**
Acrolein	**193.53**	**3.9**
Benzene	**116.26**	**6.7**
Formaldehyde	**1508.47**	**33.0**
PAH's	**10.38**	**0.044**
Benzo(a)anthracene	0.021210	0.044
Benzo(a)pyrene	0.008296	0.044
Benzo(b)fluoranthene	0.017097	0.044
Benzo(g,h,i)perylene	0.014068	0.044
Benzo(k)fluoranthene	0.007431	0.044
Chrysene	0.022364	0.044
Dibenz(a,h)anthracene	0.000902	0.044
Indeno(1,2,3-cd)pyrene	0.012192	0.044

STATEMENT OF COMPLIANCE

The owner/operator of S-3 Natural-Gas Fired Engine Waukesha VGF Series Model VHP9500GSI shall comply with Reg. 6 (Particulate Matter and Visible Emissions Standards) and Reg. 9-1-301 (Inorganic Gaseous Pollutants: Sulfur Dioxide for Limitations on Ground Level Concentrations). The owner/operator is expected to comply with Regulation 6 since the units are fueled with natural gas. Thus, for any period aggregating more than three minutes in any hour, there should be no visible emission as dark or darker than No. 1 on the Ringlemann Chart (Regulation 6-301) and no visible emission to exceed 20% opacity (Regulation 6-302). Sulfur oxides are also very low since natural gas is being used to fire the compressor. Sulfur compounds are removed from natural gas at processing plants. The engine is conditionally permitted to meet BACT requirements at 0.15 g/bhp-hr or 9 ppmvd at 15% O2 of NOx and 0.60 g/bhp-hr or 56 ppmvd at 15% O2 of CO. Thus, engine NOx emissions meet the limit of 56 ppmv at 15% O2 in Regulation 9-8-301.1 and CO emissions meet the limit of 2000 ppmv at 15% O2 in Regulation 9-8-301.3.

The project is considered to be ministerial under the District's CEQA regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emissions factors and therefore is not discretionary as defined by CEQA. (Permit Handbook Chapter 2.3)

The project is within 1000 feet from the nearest school and therefore subject to the public notification requirements of Reg. 2-1-412.

Best Available Control Technology: In accordance with Regulation 2, Rule 2, Section 301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NOx, CO, SO_2 or PM_{10}. Based on the emission calculations above, the owner/operator of S-3 is subject to BACT for the following pollutant: CO. BACT 1 has not been determined for CO and the engine is conditionally permitted to meet BACT 2 for CO, which is 2.75 g/bhp-hr.

Offsets: Offsets must be provided for any new or modified source at a facility that emits more than 15 tons/yr of POC or NOx. The District may provide offsets from the Small Facility Banking Account for a facility with emissions between 15 and 50 tons/yr of POC or NOx, provided that facility has no available offsets, and all existing sources of POC and/or NOx are equipped with Best Available Retrofit Control Technology (BARCT). Based on the emission calculations above, offsets are not required for this application.

PSD, NSPS, and NESHAPS do not apply.

PERMIT CONDITIONS

Conditions for:

S-3 Electrical Engine: Natural Gas; Make: Waukesha; Model: VHP9500GSI; Rated Horsepower: 1200; Abated by: A-1 Catalytic Converter, Miratech CS-2003-3072

1. The owner/operator of S-3 Natural-Gas Fired Engine (Waukesha VHP9500GSI), shall fire it exclusively with natural gas at a firing rate not to exceed 16.8 MMBtu/hr (HHV).
   (basis: Cumulative Increase and BACT)

2. The owner/operator shall not operate the engine unless NOx, CO and POC emissions are abated by A-1 catalytic converter.
   (basis: Cumulative Increase, BACT)

3. The owner/operator of S-3 shall not exceed the following emissions limits:
   NOx 0.15 g/bhp-hr (9 ppmvd at 15% O2)
   CO 0.60 g/bhp-hr (56 ppmvd at 15% O2)
   POC 0.15 g/bhp-hr (25 ppmvd at 15% O2)
   (basis: Cumulative Increase and CO BACT)

4. To demonstrate compliance with Condition 3, the owner/operator shall measure the NOx and CO concentration from S-3. Measurements may be made using a District-approved source test, or using hand-held portable NOx and CO monitors. Testing shall be done according to the following schedule:
   a) Within 30 days of startup or longer with written approval from the District. The owner/operator may submit a request detailing why an extension should be granted.
   b) If using a hand-held monitor, at least every 6-months, following startup.
   c) If using a District Approved source test, at least once per consecutive 24-month period, following startup.

Hand-held portable monitors shall be operated, maintained and calibrated in accordance with manufacturer guidelines. All source testing shall be done in accordance with the District's Manual of Procedures. The facility shall receive approval from the District's Source Test Manager for installation of test ports and source testing procedures. The results shall be delivered to the District no later than 30 days from the date of the source test.
(basis: Cumulative Increase and BACT, Regulation 9-8-501)

5. The owner/operator shall retain the following records on-site for two years, from the date of entry, and make them available for inspection by District staff upon request.
    a. CO, Nox, and POC concentration measurements taken as per Condition 5.
    b. Any source test records.

    (basis: BACT, Cumulative Increase, Reg. 9-8-530: Record keeping)

RECOMMENDATION
Issue an Authority to Construct to Solano County for the following source:

S-3 Electrical Engine: Natural Gas; Make: Waukesha; Model: VHP9500GSI; Rated Horsepower: 1200; Abated by: A-1 Catalytic Converter, Miratech CS-2003-3072

EXEMPTIONS
None.

By:_____ Date:_____

Joumana Zeid
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